CONTENTS.

VOL. VIII.

Page

Air and Steam Engines 182
Alexandria Harbor 159
American Chain Cable Test..... 190
American Institute of Mining Engineers 473
American Locomotives in Russia..... 283, 476
American Pig Iron Manufacturers' Association..... 476
American Society of Civil Engineers 89, 185, 280, 375, 469
American Society of Civil Engineers. 563
Application of Architectural Design to Engineering Works .. 513
Architectural Design, Application of 513
Armor Plate, Experiments of, 1872 481
Arches, Stresses of.....193, 289, 385
Architectural Practice..... 110
Architecture, Mediæval and Gothic 250
Architecture of Music Halls ... 345
Architecture of the World of Atoms 480
Armor and Armament..... 401
Armor or No Armor..... 271
Arrivals of the Year 1872..... 285
Artesian Wells at Chicago..... 96
Asphalts.....74, 123

Barron's Steel Process 91
Batteries, Electrical 58
Battery, New York... 381
Behavior of Granite..... 192
Bessemer Process..... 564
Bessemer Saloon Steamboat.... 211
Bismuth, Extraction of..... 288
Blast Furnaces.....354, 450, 548
Blast Furnace Slag, Utilization of..... 203
Blast Furnace at Summerlee ... 564
Blast Furnaces, Tuyeres for ... 486
Bonding in the Skew Arch..... 23
Book Notices:
Anderson, John. Text-Books of Science..... 191
Beckwith, L. F. Report on the Hydraulic Mining of Teil..... 480
Bergen, W. C. Practice and Theory of Navigation and Nautical Astronomy..... 191

Book Notices: Page
Boileau, J. F. New set of Traverse Tables..... 191
Brisse, Ch. Cours de Physique 569
Clode, C. M. Administration of Justice..... 286
Collins, J. H. First Book of Mining and Quarrying .. 95
Collins' Elementary Science Series..... 382
Cordier, Eug. Equilibre Stable des Carpentes en Fer, en Bois, et Fonte ... 569
Dawson, J. W. Story of the Earth and Man. 479
Deschanel, A. P. Elementary Treatise on Natural Philosophy..... 95
Drysdale, Dr. J., and Hayward, Dr. J. W. Health and Comfort in House-Building..... 95
Feuchtwagner, Dr. L. Popular Treatise on Gems.... 95
Haughton, Rev. S. Principles of Animal Mechanics. 568
Holley, G. W. Niagara; its History and Geology..... 93
Hughes, Samuel. Treatise on Water-Works 191
Johnson, F. G. Natural Philosophy, and Key to Philosophical Charts..... 286
Lacroix, Eugene. La Construction des Ponts et Viaducs..... 95
Lazelle, Capt. H. M. One Law in Nature 191
Makins, G. H. Manual of Metallurgy 479
Matheson, Ewing. Works in Iron: Bridge and Roof Structures 478
Mayer, A. M. Earth a Magnet 286
Medley, J. G. A Tour in the United States and Canada..... 569
Medley, J. G. India and Indian Engineering 568
McCord, C. N. Practical Treatise on the Movements of Slide Valves by Eccentrics 94, 382
Morfit, C. Mineral Phos-

Page

Book Notices:
phates and Pure Fertilizers..... ....286, 384
Murray, David. Manual of Land Surveying..... 95
Myer, General. Government Report 285
Orton, Jas. Underground Treasures 287
Proctor, R. A. Elementary Physical Geography..... 480
Proctor, R. A. Lessons in Elementary Astronomy.. 480
Redtenbacher, F. Principes de la Construction des Organes des Machines ... 569
Report of the United States Lighthouse Board.. ... 191
Richards, J. Treatise on the Construction and Operation of Wood-Working Machines..... 192
Shreve, S. H. Treatise on the Strength of Bridges and Roofs.....287, 479, 567
Stockwell, J. N. Stock and Interest Tables 569
Stoney, B. A. Theory of Strains in Girders. 383
Thomson, C. W. Depths of the Sea..... ... 382
Thomson, Sir W. Electrostatics and Magnetism... 285
Timbs, John. Year-Book of Facts in Science and Art..... 480
Weale, J. Scientific Dictionary..... 569
With, Emile. Les Machines 569
Wyatt, Digby. An Architect's Note-Book in Spain. 191
Bridge Girders, Tay..... 558
Bridge at St. Louis..... 380
Bridge on the Lima and Oroya Railway 477
Bridge over the Thames..... 380
Bridge, St Louis 189
Bridges, Road and Railway..... 248
Building Stones, Artificial..203, 371

Canal from New Brunswick to Nova Scotia..... 93
Canals, Flow of Water in..... 1
Cast-Steel, Manufacture of..... 476

14794

	Page
Cast-Iron, Crystallized	282
Cements, Ancient and Rosendale.	205
Cements, Formulæ for	264
Changes in British Artillery Material	142
Channel Passage	86
Chapin's Electro-Magnetic Continuous Railway Brake	565
Cheap Transport for Railway Lines	229, 467
Chicago and Alton Railroad	16
Circulation in Boilers	342
Civil and Mechanical Engineers' Society	378
Cleveland Lake Tunnel	189
Coal-Cutting Machinery	89
Coal Famine — Economies and Remedies	445
Composition of Ancient Cements and Rosendale Cements	205
Compressed Air Engines at the Thornhill Collieries	28
Concrete Building	113
Construction of Modern Warehouses	420
Consuming Smoke in Engine Furnaces	16
Continuous Brakes	528
Continuous Expansion Engines.	13
Continuous Railway Brakes 187,	474
Cost of Steam	20
Cost of Tunnels	284
Crystallized Cast-Iron	282
Danish Iron-Clad Man-of-War.	285
Decay of Stone	288
Deepest Well in the World.	284
Dephosphorizing Iron in Puddling	379
Depth of Plate Girders	316
Devastation	488
Discharge of Rivers and other Channels	32
Electrical Batteries	58
Enamelled Brick Manufacture	408
Engineering Works, Architectural Design of	513
Engines, Continuous, Expansion.	13
Engines, Furnace Gas	424
Engines, Traction	254
English Iron-Clads	443
Euphrates Railway	494
Experimental Study of Waves.	490
Experiments, Armor Plate	481
Examples of Road and Railway Bridges	248
Extraction of Bismuth from certain Ores	287
Festiniog as a Type	305
Fire-proof Gunpowder Magazines	126
Flow of Water in Open Canals.	1
Flow of Water in Open Channels.	97
Fly-Wheels, Strength of.	171
Foreign Scientific Items	7
Foreign Scientific Notes.	277
Forging Iron, Hints on	448
Foundations	40
Foundations, Concrete, Brickwork and Stonework	336
Furnace Gas Engines	424
Future Overland Route to India.	192
Galvanic Batteries	215
Generation of Heat	318
Gold and Platinum in the Muscovite Empire	96
Granite, Behavior of.	192
Gunboats, The Composite	566
Gunpowder, Manufacture of.	468
Gunpowder Problem	330
Hardening, Tempering, and Welding of Steel	351
Heat, Generation of	318
Heavy Guns at Sea	373
High Bridge on the Lima and Oroya Railway	477
High Pressure Steam, Use of.	413
Hints on Forging Iron	448
Homfray's Pneumatic Telegraph	201
Hoosac Tunnel	66, 477
Hot Blast	475
Hulls, Resistance of	267
Hydraulic Steering Gear.	496
Improvements in the Manufacture of Cast-Steel	476
Injectors	71
Income of the Union Pacific Road	109
Institution of Civil Engineers	473
Institution of Mechanical Engineers	378
International Tonnage	332
Iowa Railways	112
Iron, Dephosphorizing in Puddling	563
Iron, Manganese in	564
Iron Outlook Abroad	565
Iron, Rolling of	563
Iron and Steel in China	570
Iron, Sulphur in	570
Iron-Clad, Danish	285
Iron, Forging	448
Iron in Blast Furnace Slags	379
Iron, Metallurgy of	243
Iron and Ore of Lake Superior.	282
Iron Ore of Lake Superior	92
Iron, Purifying of	188
Iron Steamer Colon	381
Iron and Steel Industries, Progress of	132
Iron and Steel Industries in Foreign Countries	310
Iron and Steel Soldering	287, 384
Iron and Steel, Sulphur in.	188
Iron Trade, Scotch, of 1872.	281
Iron, White Pig, and its Slag.	282
Irrigation in Northern India	367
Lands, Effects of Railroads on the Value of	540
Light, Oxyhydric	55
Lightning and Lightning Conductors	147
Locomotive Working Expenditure	48
Locomotives, American	283
Locomotives, New Fuel for	565
Locomotives, Road	254
London Society of Engineers	187
Machinery, White Metal Alloys for	570
Magnets	561
Manganese in Different Steels, Amount of	564
Magnetism, Terrestrial.	235
Magnetite in Spain	92
Manufacture of Gunpowder	468
Marine Brake	93
Masonry	497
Materials of the Architect	36
Mechanical Science and Skill of the Chinese	288
Mediæval and Gothic Architecture	250
Metals, Austrian Imports of.	570
Metallurgy of Iron	243
Metallurgy of Manganese	161
Meteorological Inquiry, Results of.	519
Michigan Central Railroad	112
Mining Transit and Plummet Lamp	504
Modern Practice of Ship-Building	165
Modern Use of Zinc.	81
Mont Cenis Tunnel	473
Narrow Gauge Experiment.	189
Navy, British.	284
Navy, Russian	284
Neutral Axis, Experiments on.	185, 469
New Gunboats	478
New Haven Railroad Depot.	192
New Railroad in Massachusetts.	92
North Sea Canal of Holland.	176
Note off Heating Steam	12
Offensive Use of Torpedoes in Naval Actions	511
Old Thames Embankment Wall	93
Ordnance Survey of Great Britain	338
Overland Route to India	192
Oxidation of Iron	127
Oxyhydric Light	55
Paper Car Wheels	96
Paper for Tracing	570
Paris Society of Engineers.	188
Patent Ship-Raising Steamer.	381
Petroleum	17
Pile Foundations, Pneumatic.	470
Pittsburg Steel Works.	112
Plate Girders, Depth of.	316
Platinum.	569
Pneumatic Pile Foundations.	470
Pointed Roofs	62
Preservation of Wood by Means of Tar.	505
Prevention of and Means of Arresting Putrefaction	67
Production of Rails in the United States.	477
Progress of the Iron and Steel Industries	132
Puddled Walls	51
Puddling by the Furnace Gases.	283
Railroad, Chicago and Alton.	16
Railroad Company, Burlington and Missouri River	503
Railroads, Effects of, on the Value of Lands	540
Railroad, a Contemplated	565
Railroad, Freight Transported by Union Pacific	566
Railroad Extension	283
Railroad Gauge in Canada.	92
Railroad in Massachusetts	92
Railroad, Michigan Central.	112
Rails, Production of.	477
Rails, Steel	91
Railway Axles, Strains on	274
Railway Bridges.	248
Railway Brakes, Continuous.	187, 474
Railways, Iowa	112
Railway Lines, Cheap Transport for.	229
Railway Speed.	220
Railway, St. Gothard.	477
Railway Brakes, Chapin's.	565

	Page
Railway, New Narrow Gauge	566
Railway, Euphrates	494
Railways and their Future Development	531
Rendering Wood Incombustible	409
Resistance of Immersed Hulls	267
Results of Recent Meteorological Inquiry	519
Retaining Walls	375
Rival to the Bessemer Ship	381
Rivers, Discharge of	32
Roman Bath in the Strand	192
Russian Navy	284
Scientific and Mechanical Society	281, 377
Scientific Items, Foreign	7
Scientific Notes	277
Scotch Iron Trade of 1872	281
Screw Shafts	224
Sewage, Alum, Blood and Charcoal	156, 226
Sewage Problem, Solution of	429
Sewer Gas	102
Shaw's Method of Purifying Iron	188
Ship-Building, Modern Practice of	165
Ship-Building Trade on the Clyde	285
Ships and Shells	26
Ships for the Channel Passage	417
Ships of War	120
Smoke Prevention	209
Slag, Utilization of	203, 509
Society of Engineers	474, 562
Society of Telegraph Engineers	379
Soldering Iron and Steel	287, 384
Solution of the Sewage Problem	429
State of the British Navy	284
Steam and Air Engines	182
Steam, Cost of	20
Steam Engine Performances	144
Steam Ferryboat	478
Steam, Note on Heating	12
Steam-Jacket, its Action, Advantages, and Disadvantages	525
Steamer, the Oldest in the World	569
Steamboat, Bessemer Saloon	211
Steel, Influence of Magnetism on	563
Steel, Manganese in	564
Steel, Sulphur in	570
Steel, Tungsten	564
Steel Process, Barron's	91
Steel Rails	91
Steel, Tempering and Welding of	188, 351
Steel Works in Rhode Island	475
Steering Gear, New Hydraulic	496
St. Gothard Railway	477
St. Louis Bridge	189
Stone, Decay of	288
Strains on Railway Axles	274
Strength of Fly-Wheels	171
Stresses of Rigid Arches, Continuous Beams, and Curved Structures	193, 289, 385
Sulphur in Iron and Steel	188
Tay Bridge Girders	558
Telegraph, Homfray's Pneumatic	201
Telegraph Battery for Military Purposes	381
Tempering Steel	188
Tempering of Drills	570
Terrestrial Magnetism	235
Tin Mines of Cornwall	82
Tonnage, International	332
Torpedoes, Offensive Use of	511
Towboat America	567
Traction Engines or Road Locomotives	254
Train Speeds on Freight Lines	460
Travelling Cranes	566
Tunnel, Severn	566
Tunnel at Cairo	284
Tunnel, Cleveland Lake	189
Tunnels, Cost of	284
Tunnel, Hoosac	66, 477
Tunnel, Mont Cenis	473
Tunnel under the Mersey	92
Tuyeres for Blast Furnaces	486
United States Navy List	190
Use and Abuse of Dynamical Terms	438
Use of High Pressure Steam	413
Use of Water Glass in Building	184
Useful Formulæ for Cements	264
Utilization of Blast Furnace Slag	203
Utilization of Slag	509
Vienna Exposition	567
Water Route from St. Lawrence River to New York City	570
Waves, Experimental Study of	490
Wear of Iron Rails	380
What is Steel?	148
White Pig Iron and its Slag	282
Wood, Preservation of	505
Yorkshire Architectural Society	377
Zinc, Use of	31